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LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			ZHEN, WEI Y	
			ART UNIT	PAPER NUMBER
			2191	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/896,374

Applicant(s)

ACHLIOPTAS ET AL.

Examiner

Wei Y. Zhen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 and 16 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-15 and 17-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the amendment filed on 1/19/2005.
2. Claims 1-78 are pending.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-7, 9-15, 17-20, 22-27, 29-65, 78 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-7, 9-15, 17-20, 22-27, 29-65, 78 are directed to non-statutory subject matter because the claims recite various steps to test software and steps can be done by a person as a mental step or using pencil and paper that do not require a present of a computer hardware to be executed. Therefore, The language of the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 22-23, 40-41, 56-65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "less deterministic" in claim 22 is a relative term which renders the claim indefinite. The term "less deterministic" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of applying prior art rejection, the examiner is interpreting the claim broadly as applying different algorithms.

The term "less random" in claim 23 is a relative term which renders the claim indefinite. The term "less random" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of applying prior art rejection, the examiner is interpreting the claim broadly as applying different algorithms

The term "more deterministic" in claim 40 is a relative term which renders the claim indefinite. The term "more deterministic" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of applying prior art rejection, the examiner is interpreting the claim broadly as applying different algorithms

The term "more random" in claim 41 is a relative term which renders the claim indefinite. The term "more random" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

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reasonably apprised of the scope of the invention. For the purpose of applying prior art rejection, the examiner is interpreting the claim broadly as applying different algorithms

The term "more likely" in claim 56 is a relative term which renders the claim indefinite. The term "more likely" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The term "having a better chance" in claim 57 is a relative term which renders the claim indefinite. The term "having a better chance" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of applying prior art rejection, the examiner is interpreting the claim broadly as applying an algorithm.

Claims 58-65 depend on claim 57 and are rejected for the reason set forth in the rejections of claim 57 above.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17-18, 21-22, 24-28, 37-45, 48-50, 53-55, 57-61, 65-67, 73, 76-78 are rejected under 35 U.S.C. 102(b) as being anticipated by Schaffer, U.S. Patent No. 5,911,041.

As per claim 17, Schaffer discloses

traversing a state graph that models software (col. 5 lines 40-48), the state graph having multiple nodes individual ones of which represent a state, and links between the nodes that represent actions (Fig. 2, col. 5 lines 40-48), said traversing using an algorithm having a first graph traversal characteristic to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); and traversing the state graph using an algorithm having a second graph traversal characteristic that is different from the first graph traversal characteristic to produce a further sequence of test actions (col. 6 lines 12-17 and lines 52-56).

As per claim 18, Schaffer discloses wherein the algorithms are different (col. 6 lines 12-17 and lines 52-56).

Claim 21 is rejected for the reason set forth in the rejection of claim 17 above.

As per claim 22, Schaffer discloses traversing a state graph using a deterministic first algorithm to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17), the state graph having multiple nodes individual ones of which represent a state, and links between the nodes that represent actions (Fig. 2, col. 5 lines 40-48); and traversing the state graph using a second algorithm that is less deterministic than the first algorithm to produce a further sequence of test actions (col. 6 lines 12-17 and lines 52-56).

As per claim 24, Schaffer discloses providing one or more algorithms for operating on a software model that describes behavior associated with software that is to be tested (col. 5 lines 40-48); selecting one or more algorithms; operating on the software model using the selected one

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or more algorithms to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); changing the selected one or more algorithms; and operating on the software model using one or more changed algorithms (col. 6 lines 12-17 and lines 52-56).

As per claim 25, Schaffer discloses said changing comprises changing a way an algorithm interacts with the software model (col. 5 lines 54-67, col. 6 lines 12-17 and lines 52-56).

As per claim 26, Schaffer discloses in said changing comprises changing one or more properties associated with an algorithm (col. 5 lines 54-67, col. 6 lines 12-17 and lines 52-56).

As per claim 27, Schaffer discloses wherein said changing comprises selecting at least one different algorithm (col. 5 lines 54-67, col. 6 lines 12-17 and lines 52-56).

As per claim 28, Schaffer discloses provide one or more algorithms for operating on a software model that describes behavior associated with software that is to be tested (Fig. 2, col. 5 lines 40-48); select multiple algorithms to define a first collection of algorithms; operate on the software model using the first collection of algorithms to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); change at least one of the selected algorithms to define a second collection of algorithms; and operate on the software model using the second collection of algorithms to produce an additional sequence of test actions (col. 6 lines 12-17 and lines 52-56).

As per claim 37, Schaffer discloses selecting a first algorithm from among a number of different algorithms; operating on a software model that describes behavior of software that is to be tested (Fig. 2, col. 5 lines 40-48); said operating taking N steps using the first algorithm, where N is an integer and said steps produce a sequence of test actions tested (col. 5 lines 40-48,

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col. 5 line 64 to col. 6 line 17); selecting a second algorithm from among the number of different algorithms, the second algorithm being different from the first algorithm; and operating on the software model by taking N1 steps using the second algorithm, where N1 is an integer, said N1 steps producing an additional sequence of test actions (col. 6 lines 12-17 and lines 52-56).

As per claims 38 and 39 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 40 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 41 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 42 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 43 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claims 44, 45 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 48-50 (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 and lines 52-56).

As per claim 53, Schaffer representing software using a model that describes the software's behavior, the software having an associated social context (Fig. 2, col. 5 lines 40-48); and selecting one or more algorithms to operate upon the model as a function of the software's social context; and operating upon the model using the selected one or more algorithms to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 56).

As per claim 54, Schaffer discloses the social context is associated with a software developer who developed the software (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17).

As per claim 55, (Schaffer, col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17).

As per claim 57, Schaffer discloses defining one or more clusters in a software model that models software that is to be tested (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); providing

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multiple different algorithms for operating upon the software model; selecting a first algorithm for operating on the software model to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); selecting a second algorithm that is different from the first algorithm for operating on the software model to produce an additional sequence of test actions; and operating on the software model using the first and second algorithms to produce the sequences of test actions, one of the first and second algorithms having a better chance at accessing a cluster than the other of the first and second algorithms (col. 6 lines 12-17 and lines 52-56).

As per claim 58, Schaffer discloses said software model comprises a state graph having multiple nodes and links between the nodes, individual nodes representing states, individual links representing actions that move between states (Fig. 2, col. 5 lines 40-48).

As per claim 59, Schaffer discloses the first and second algorithms have different graph traversal characteristics (col. 6 lines 12-17 and lines 52-56).

As per claim 60, Schaffer defining comprises defining the clusters based on areas of connectivity within the state graph (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17).

As per claim 61, Schaffer said defining comprises defining the clusters based on the structure of the software (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17).

Claim 65 is rejected for the reason set forth in the rejection of claim 22.

As per claim 66, Schaffer discloses a software model processor configured to: receive a software model that describes behavior associated with software that is to be tested (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17), and operate upon the model to provide a sequence of test commands for testing the software; and an algorithm set associated with the model processor and comprising multiple different algorithms, the software model processor being configured to

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select at least two different algorithms and use the algorithms to operate upon the software model to produce the sequence of test commands (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 56).

As per claim 67, Schaffer discloses wherein the model processor is configured to change one or more of the algorithm (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 56).

As per claim 73, Schaffer discloses a software model processor configured to: receive a software model in the form of a state graph that describes behavior associated with software (Fig. 2, col. 5 lines 40-48); the state graph having multiple nodes that represent state, and links between the nodes that represent actions (Fig. 2, col. 5 lines 40-48);, and traverse the state graph to provide a sequence of commands for testing the software; an algorithm set associated with the model processor and comprising multiple different algorithms; and a graph traverser associated with the model processor and configured to: traverse the state graph using an algorithm from the algorithm set, the algorithm having a first graph traversal characteristic to produce a sequence of test commands (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17), and traverse graph with an algorithm from the algorithm set having a second graph traversal characteristic that is different from the first graph traversal characteristic to produce a further sequence of test commands (col. 6 lines 12-17 and lines 52-56).

As per claim 76, Schaffer discloses means for receiving a software model (Fig. 2, col. 5 lines 40-48); means for operating on the software model in a first manner to produce a sequence of test actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); and means for operating on the software model in different additional manners to produce additional sequences of test actions (col. 6 lines 12-17 and lines 52-56).

As per claim 77, (Schaffer, col. 6 lines 12-17 and lines 52-56).

As per claim 78, Schaffer discloses representing software using a model comprising a state graph, the state graph having multiple nodes individual ones of which represent a state, and links between the nodes that represent actions (Fig. 2, col. 5 lines 40-48); traversing the state graph using an algorithm having a first graph traversal characteristic to produce a sequence of user actions (col. 5 lines 40-48, col. 5 line 64 to col. 6 line 17); and traversing the state graph using an algorithm having a second graph traversal characteristic that is different from the first graph traversal characteristic to produce a further sequence of user actions (col. 6 lines 12-17 and lines 52-56).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-20, 23, 46-47, 51-52, 56, 63-64, 68-72, 74, 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Schaffer, U.S. Patent No. 5,911,041 in view of applicant's admission of prior arts.

As per claims, 19-20, 63-64, Schaffer does not explicitly said multiple other algorithms, a random walk algorithm, a Chinese postman algorithm, a Markov chain algorithm and a anti-random walk algorithm. However, in the background section of the present application, applicant admits that various types of algorithm such as a random walk algorithm, a Chinese

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postman algorithm, a Markov chain algorithm and a anti-random walk algorithm were well known in the art at the time the invention was made (p. 5-10 of the specification). Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the well known knowledge into the teaching of Schaffer to have the algorithm to be one of the well known algorithm because doing so provides different method to test thoroughly with different types of well-known algorithms.

As per claim 23, Schaffer discloses traversing a state graph using an algorithm to produce a sequence of test actions, the state graph having multiple nodes individual ones of which represent a state, and links between the nodes that represent actions (Fig. 2, col. 5 lines 40-48), and traversing the state graph using a second algorithm that is less random than the first algorithm to produce a further sequence of test actions (col. 6 lines 12-17 and lines 52-56).

Schaffer does not explicitly disclose the algorithm is a random walk first algorithm. However, in the background section of the present application, applicant admits that various types of were well known in the art at the time the invention was made (p. 5-10 of the specification). Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the well known knowledge into the teaching of Schaffer to have the algorithm to be a random walk first algorithm because one would want to evaluate the performance of the software thoroughly using various types of well known algorithm.

As per claims 46-47, Schaffer does not explicitly discloses N and $N1$ are calculated using a Poisson distribution having multiple values each with an assigned probability of being selected and the assigned probabilities change over time. However, Official Notice is taken that Poisson distribution and probabilities changes over time was well known at the time the invention was

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made. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the teaching of the well known knowledge to have N and N1 be calculated using a Poisson distribution having multiple values each with an assigned probability which changes over time because one would want to calculate N and N1 using the well known method to produce algorithm to test the software thorough.

As per claims 51-52, Schaffer does not explicitly discloses replacing one or more of the algorithms after a certain period of time or after the one or more algorithms have been used a certain number of times. However, Official Notice is taken that replacing testing algorithms after a certain period of time or after the one or more algorithms have been used a certain number of times were well known in the art at the time the invention was made. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate the teaching of the well known knowledge to replace testing algorithms after a certain period of time or after the one or more algorithms have been used a certain number of times because doing so ensures the testing algorithms is up to date and provides an efficient method to test the software more accurately and more thoroughly.

As per claim 56, Schaffer discloses everything except the developer profile describing algorithm. However, it was well known in the art testing software developing by different developers using different algorithm. Therefore, it would have been obvious to have developer profile describing algorithm because one would want to use the appropriate algorithm to test software more accurately and more thoroughly.

Claims 68-72, 74, 75 are rejected for the reason set forth in the rejection of claims 63-64.

Allowable Subject Matter

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7. Claims 8, 16 are allowed.

Response to Arguments

8. Applicant's arguments with respect to claims 1-78 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wei Y. Zhen whose telephone number is (571) 272-3708. The examiner can normally be reached on Monday-Friday, 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wei Zhen
5/16/2005


WEI Y. ZHEN
PRIMARY EXAMINER